REMARKS

Claims 1-23 are pending in the current application. Applicant has amended claims 1, 2, 4, 8, 10, 14, 16, 20, and 21. Reexamination and reconsideration of all claims, as amended, are respectfully requested.

§ 112

The Office Action rejected claims 4-8, 13-15, and 18-23 under 35 U.S.C. § 112, second paragraph based on various issues, and claims 1, 2, 10, and 21 under 35 U.S.C. § 112 based on alleged improper antecedent bases.

The Office Action rejected claims 4-7 based on element b1) as recited in these claims. Applicants have amended claim 4 to correctly recite the relationship between the elements of claims 1, 3 and 4. Claim 5 depends from claim 4 which in turn depends from claim 1, and thus reference in claim 5 to element b1) appropriately indicates the element b1) listed in amended claim 4. With respect to claims 6 and 7, Applicant notes that claims 6 and 7 depend from claim 1, and claim 1 only includes an element b). Thus inclusion of alternate element b1) limitations in claims 6 and 7, where the alternate b1) limitations differ from the element b1) limitations presented in claim 3 or 4, is submitted to be clear and acceptable.

Claim 8 has been amended to clarify the limitation contained therein and its relationship to the elements of claim 1 from which it depends.

Per the Examiner's request, similar amendments to those noted above have been made to claims 14 and 20.

Minor typographical errors have been corrected in claims 15 and 16.

Applicant has amended claims 1, 2, 10, and 21 to provide for proper antecedent bases for all elements of these claims.

By these amendments, Applicant respectfully submits that all pending claims fully conform to 35 U.S.C. § 112.

§ 102

The Office Action rejected claims 1-23 under 35 U.S.C. § 102(b) based on Szeliski et al., U.S. Patent 6,009,190 ("Szeliski"). Applicant respectfully traverses these rejections.

Szeliski is directed to a texture map construction method and apparatus. (Szeliski, Abstract) The Szeliski design constructs, from a set of overlapping images, a texture map divisible into plural faces. (*Id.*) The design computes a texture mapping transform which maps between pixel locations in the texture map and a three-dimensional coordinate system. (*Id.*) The design purportedly produces a set of image pixel values from the set of overlapping images for the one pixel location in the texture space, and the set of image pixel values are blended to produce a composite pixel value for the one pixel location in the one face of the texture map. (*Id.*)

The present invention processes a digital signal to enhance resolution. (Specification, p. 3) The invention processes an image for display on a display having sub-pixel display capability. (*Id.*) As claimed in claim 1, the method includes mapping an area of a display to a region of the image, the area operable to display a first color of a plurality of colors. Based on intensity of the first color in the region of the image, the method further specifies calculating an intensity value for the first color to be displayed in the area of the display, wherein the region comprises an intensity value for each of the plurality of colors. The method then repeats the mapping and calculating for additional areas of the display corresponding to additional regions of the image, mapping each area to its own region, wherein the image is processed.

In rejecting claim 1, the Office Action cites certain passages of Szeliski for each of the foregoing elements. For the "mapping" limitation a), the Office Action cites col. 28, ll. 39-44. This passage states:

> A method for efficiently computing texture map color values for any geometry and choice of texture map coordinates is now described. A generalization of this method can be used to

project a collection of images onto an arbitrary model, e.g., non-convex models which do not surround the viewer.

Missing from this passage is the concept of the area being operable to display a first color of a plurality of colors. One example provided in the current Specification is the red sub-pixel 313a mapped to region 303a. Specification, p. 8. The foregoing passage does not relate to this type of mapping or this type of operability to display a first color from a plurality of colors. In fact, Szeliski speaks after the foregoing passage about triangulated surfaces and addressing mapping vertices of a cube of FIG. 27 to vertices of a texture map as shown in FIG. 28, an altogether entirely different concept.

In rejecting the second element of claim 1, namely calculating the intensity value for the first color, the Office Action alleges this to be shown at col. 29, ll. 54-67. This passage of Szeliski states:

> In the fourth step, the pseudocolor associated with each pixel inside the composited image is found. This is done by referring to the pseudocolor of the triangle T associated with the matrix M_T used to compute x_k .about.M_k M_T^{-1} u. The composited pixel value (color or intensity) is placed into a corresponding pixel location in a triangle in the texture map if the pseudocolor of the composited pixel (stored in the auxiliary buffer constructed in step 1 above) matches the face color id tag of that triangle. The pseudocoloring/stenciling method described here facilitates the assignment of appropriate composite pixel values to pixel locations in invisible regions of the texture map by propagating pseudocolor id tags of pixels in visible regions into nearby invisible regions, as described above.

Again, this refers to triangles in a texture map, a different concept from that presented here. More importantly, the foregoing passage does not discuss calculating an intensity value for the first color (such as red) to be displayed in the area of the display based on intensity of the first color (such as red) in the region of the image as

required by the b) limitation of claim 1. The most that can be said of the Szeliski passage quoted is that a composited pixel value, color or intensity, is placed into a corresponding pixel location if the pseudocolor of the composited pixel matches the face color id tag of that triangle, or, in other words, the design places a pixel value (color or intensity) in a location depending on its matching a color face id tag. No calculation of an intensity value is discussed, and certainly not based on the intensity of the color in the region of the image. Further, this limitation in claim 1 requires the region comprising an intensity value for each of said plurality of colors. No intensity for each of a plurality of colors is discussed in the foregoing passage.

The concept of "pseudocolors" differs from the "first color" of the present claims. Selecting specific pseudocolors is not discussed in Szeliski in detail. For example, if a triangle is orange, it is unclear what pseudocolor (orange or otherwise) is initially employed. Pseudocolors are discussed as follows:

> The first step, namely the painting of a unique pseudocolor into each triangle as a color id tag, uses an auxiliary buffer the same size as the texture map. Every pixel within the triangle is assigned the pseudocolor of that triangle. An RGB image can be used, which means that 2^{24} colors are available. (For ease of monitoring and debugging, each pseudocolor or face color "id" tag is converted into R, G, and B values by first un-interleaving the bits and then bit-reversing each color byte. This results in a color progression where the high-order bits in each channel vary most rapidly.)

Szeliski, col. 29, ll. 4-14. Again, if the triangle is orange, every pixel in the triangle is assigned the pseudocolor of orange. If magenta, then all pixels are magenta. This differs from calculating an intensity value for a first color, wherein the region comprises an intensity value for each set of colors.

The third element of claim 1, repeating the mapping and calculating for additional areas of the display corresponding to additional regions of the image, mapping each area to its own region, wherein the image is processed, is said to be

shown by Szelinski at col. 29, ll. 1-3 and 54-62 and FIG. 31, (repeated mapping) as well as col. 27, ll. 62-67 and col. 28, ll. 1-8 (repeated calculating). These passages state:

> (3) for each triangle, form a composite (blended) image;
>
> (4) paint the composite image into the final texture map using the pseudocolors assigned in step 1 as a stencil. ...
>
> In the fourth step, the pseudocolor associated with each pixel inside the composited image is found. This is done by referring to the pseudocolor of the triangle T associated with the matrix M_T used to compute x_k .about.M_k M_T^{-1} u. The composited pixel value (color or intensity) is placed into a corresponding pixel location in a triangle in the texture map if the pseudocolor of the composited pixel (stored in the auxiliary buffer constructed in step 1 above) matches the face color id tag of that triangle. ...
>
> Once a complete panoramic mosaic has been constructed, it is necessary to convert the set of input images and associated transforms into one or more images which can be quickly rendered or viewed. A traditional way to do this is to choose either a cylindrical or spherical map. When being used as an environment map, such a representation is sometimes called a latitude-longitude projection. The color associated with each pixel is computed by first converting the pixel address to a 3D ray, and then mapping this ray into each input image through the known transformation. The colors picked up from each image are then blended using the weighting function (feathering) described earlier. For example, one can convert the rotational panorama to spherical panorama using the following method:

This does not illustrate repeated mapping or repeated calculating as provided for in elements a) and b) of claim 1. The "panoramic mosaic" discussion and 3D or

latitude-longitude projection materially differs from the present invention as claimed. Simply put, the Szeliski reference does not repeat mapping an area operable to display a first color of a plurality of colors for additional regions of an image. Further, Szeliski does not repeatedly calculate intensity values for first colors to be displayed on the display based on the intensity of the first color in the region of the image. Such a repeated calculation does not occur for additional regions of the image. The most that can be said of the cited passages in Szeliski is that triangles are assigned pseudocolors in an unspecified manner, and a composite (blended) image formed for each triangle, using a bounding box to blend all images as defined at col. 29, ll. 40-52. The composite image of Szeliski is then painted into a final texture map using the pseudocolors as a stencil.

The Szelinski design addresses triangular regions and blends aspects in bounding boxes of triangular regions, an altogether different concept form that presented and claimed in the present application. Applicant submits that based on the foregoing, claim 1 materially differs from the Szelinski design and is therefore allowable over the reference.

With respect to independent claims 10 and 16, these claims include limitations missing from Szelinski. Claim 10, as amended, requires "*based on intensity of a first color in a region of said image, calculating an intensity value for said first color to be displayed on a sub-pixel of said display*, said sub-pixel corresponding to said region of said image based on a pre-determined mapping, said pre-determined mapping providing a unique region of said image for said sub-pixel, wherein said display comprises a plurality of colors" and "repeating [the calculating] for additional regions of said image and corresponding additional sub-pixels of said display to process additional colors of said plurality of colors" (emphasis added). As noted above, Szelinski neither discloses nor suggests "calculating an intensity value for said first color to be displayed on a sub-pixel of said display," and does not perform any such calculating based on intensity of a first color in the region. Further, Szeliski does not repeat this "calculating" for additional regions of the image. Claim 16 requires "for each sub-pixel, calculating an intensity value for said sub-pixel using only intensity information for a first color from said corresponding region." Szeliski does not

calculate an intensity value for sub-pixels using only intensity information for a first color from the corresponding region. No such intensity calculation occurs in Szeliski, and particularly not using only information for a first color from a region. Applicant respectfully submits that claims 10 and 16 are therefore not anticipated by Szeliski.

All claims depending from independent claims 1, 10, and 16 are allowable over the cited references as they include elements not shown in the references.

Accordingly, it is respectfully submitted that all pending claims fully comply with 35 U.S.C. § 102.

CONCLUSION

In view of the foregoing, it is respectfully submitted that all claims of the present application are in condition for allowance. Reexamination and reconsideration of all of the claims are respectfully requested, and allowance of all the claims at an early date is solicited.

Should it be determined for any reason an insufficient fee has been paid, please charge any insufficiency to ensure consideration and allowance of this application to Deposit Account 08-2025.

Respectfully submitted,

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Steven W. Smyrski, Esq.
Registration No. 38,312

SMYRSKI & LIVESAY, LLP
3310 Airport Avenue, SW
Santa Monica, California 90405-6118
Phone: 310.397.9118
Fax: 310.397.9158